REMARKS

Claims 1, 2, 4-13, and 15 remain pending in the present application. Claim 1, 2, 4-13, and 15 were rejected under 35 U.S.C. § 103(a), as being unpatentable over U.S. Patent Application Publication No. 2002/0032499 to Wilson *et al.* ("the Wilson reference") in view of the U.S. Patent No. 6,685,814 to Uzoh *et al.* ("the Uzoh reference"). In view of the arguments set forth herein, Applicants traverse the Examiner's rejections. More particularly, Applicants respectfully submit that independent claim 1 is not rendered obvious in a *prima facie* manner to a person of an ordinary skill in the pertinent art in view of the Wilson and Uzoh references, considered either alone or in combination. Reconsideration of the rejection of pending claims is respectfully requested of the Examiner.

With respect to independent claim 1, Applicants describe and claim, among other things, a method of controlling a conductive layer deposition process. The method further comprises revising at least one parameter selected from the group consisting of a chemical concentration of an electroplating bath and an anode-cathode spacing of the deposition recipe if the measured thickness of the conductive layer is not within the predetermined tolerance. By measuring thickness of a conductive layer, a chemical concentration parameter of an electroplating bath of a deposition recipe may be selectively revised. In this way, a feedback control routine is employed to control a thickness of a conductive layer in a semiconductor manufacturing operation, in response to a chemical adjustment of the deposition recipe.

To establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. As discussed below, the Wilson

reference fails to teach or suggest selectively revising a chemical concentration parameter of a deposition recipe to produce a desired thickness based on the measurement thickness. The Examiner relies on the Uzoh reference to teach this revising feature. However, the Uzoh reference, like the Wilson reference, fails to teach or suggest selectively revising a chemical aspect of the deposition recipe itself across the entire conductive layer based on the measured thickness thereof.

In the Office Action, the Examiner states that both the Wilson and Uzoh references are purportedly related to a method of controlling a conductive layer deposition process using electroplating bath. Specifically, the Examiner concludes that the Wilson reference inherently teaches depositing a conductive layer above a second semiconductor wafer based upon the revised deposition recipe. To provide a teaching for the above set forth revising feature of independent claim 1, the Office Action relies upon the Uzoh reference. The Examiner further suggests that it is inherent that in every electroplating bath process the plating measured thickness of the conductive layer is proportional to the chemical concentration. Applicants respectfully disagree.

As the Examiner well knows, inherency requires that the asserted proposition *necessarily* flow from the disclosure. *In re Oelrich*, 212 U.S.P.Q. 323, 326 (C.C.P.A. 1981); *Levy*, 17 U.S.P.Q.2d at 1463-64; *Ex parte Skinner*, 2 U.S.P.Q.2d 1788, 1789 (Bd. Pat. App. & Int. 1987); *In re King*, 231 U.S.P.Q. 136, 138 (Fed. Cir. 1986). It is not enough that a reference could have, should have, or would have been used as the claimed invention. "The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *Oelrich*, at 326, quoting *Hansgirg v. Kemmer*, 40 U.S.P.Q. 665, 667 (C.C.P.A. 1939); *In re Rijckaert*, 28 U.S.P.Q. 1955, 1957 (Fed. Cir. 1993), quoting *Oelrich*, at 326; *see also Skinner*, at 1789. "Inherency ... may not

be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *Skinner*, at 1789, citing *Oelrich*, at 581. Where anticipation is found through inherency, the Office's burden of establishing ***prima facie*** anticipation includes the burden of providing "...some evidence or scientific reasoning to establish the reasonableness of the examiner's belief that the functional limitation is an inherent characteristic of the prior art." *Skinner*, at 1789. Applying these legal standards, it is respectfully submitted that the Wilson and Uzoh references either considered alone or in combination fail to teach or suggest either expressly or under principles of inherency, selectively revising the chemical concentration parameter of an electroplating bath of the deposition recipe itself across the entire conductive layer based on the measured thickness of the conductive layer.

As understood, the Wilson reference discusses an automatic process control for controlling a material deposition process. By tuning electrodes, electrical parameters are refined when processing a microelectronic workpiece. In the Wilson reference, for example, a first determination is made as to how a baseline set of anode currents should be varied to produce the specified target plating material thicknesses rather than baseline plating material thicknesses indicated to result from the baseline set of anode currents. A second determination is made as to how the set of anode currents designated for the first electroplating cycle should be varied to produce the specified target plating material thicknesses rather than the measured plating material thicknesses of the first workpiece. See the third and sixth method steps of claim 1 on page 10.

The Uzoh reference appears to be completely silent with regard to the concept of selectively revising a chemical concentration parameter of the electroplating bath of the deposition recipe across the entire conductive layer based on the measured thickness of the

conductive layer. Rather, it is believed that the Uzoh reference simply discloses enhancing the uniformity of electrodeposition or electroetching to uniformly deposit or etch a thin metal layer or an alloy layer on a semiconductor wafer substrate. By modifying the localized concentration of ions in the electrolytic bath in contact with different parts of a target film, more uniform electroetched or electroplated films in electroetching and electroplating processes are produced. Thus, the uniformity is enhanced by modifying the current flow or by shaping the potential field between anode and cathode (the workpiece or wafer) and the localized current flow rate, as it approaches the electroetching or electroplating target. See Col. 2 ll. 58-67.

Accordingly, the art of record does not disclose or suggest selectively revising a chemical concentration parameter of the deposition recipe itself across the entire conductive layer to produce a desired physical aspect based on a measurement of the physical aspect of a structure deposited on a semiconductor wafer. Thus, Applicants respectfully submit that the enhancing the uniformity of electrodeposition or electroetching described by the Uzoh reference is not related to any revising of a chemical concentration parameter to produce a desired plating material thickness based on the measured thickness of the plating material layer.

Furthermore, neither the Wilson reference nor the Uzoh reference provides any suggestion or motivation to modify the reference or to combine reference teachings to arrive at Applicants' claimed invention. In contrast, as discussed above, the Wilson reference teaches refining electrical parameters to produce a specified target plating material thicknesses rather than the measured plating material thicknesses of a workpiece. As such, the Uzoh reference does not describe a deposition process that controls a chemical aspect of the deposition recipe itself across the entire conductive layer, let alone based on the measured thickness of the conductive layer.

In this manner, it is believed there is no suggestion or motivation in the Uzoh reference to modify the Wilson reference or to combine teachings of these cited references. However, even if combined, the combination of the Wilson and Uzoh references cannot even remotely teach or suggest a deposition process that selectively controls a chemical aspect of the deposition recipe itself across the entire conductive layer based on a measurement of a physical aspect of a structure deposited on a semiconductor wafer.

In fact, all that the combination appears to result into is an automatic process control that controls an electrical aspect for modifying a chemical aspect of a material deposition process partially (e. g., modifying the localized concentration of ions in the electrolytic bath) and across only certain parts of a target film in a microelectronic workpiece to produce a desired physical aspect (e. g., a plating material thickness) on a semiconductor wafer substrate rather than using a measurement of a physical aspect, such as the measured plating material thickness. Thus, as set forth above, the combination of the Wilson and Uzoh references is believed to teach away from the invention claimed in claim 1.

For at least the aforementioned reasons, Applicants respectfully submit that the present invention is not obvious over the Wilson reference in view of the Uzoh reference and respectfully request that the Examiner's rejections of claims 1, 2, 4-13 and 15 be withdrawn since these claims are in condition for allowance.

In view of these remarks, the application is now in condition for allowance and Examiner's prompt action in accordance therewith is respectfully requested. If for any reason Examiner finds the application other than in condition for allowance, Examiner is respectfully

requested to call the undersigned at the Houston, Texas telephone number (713) 934-4055 to discuss the steps necessary for placing the application in condition for allowance.

Respectfully submitted,

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